Background information as epistemic intervention

Comments on Kotzen's "Selection Biases in Likelihood Arguments"

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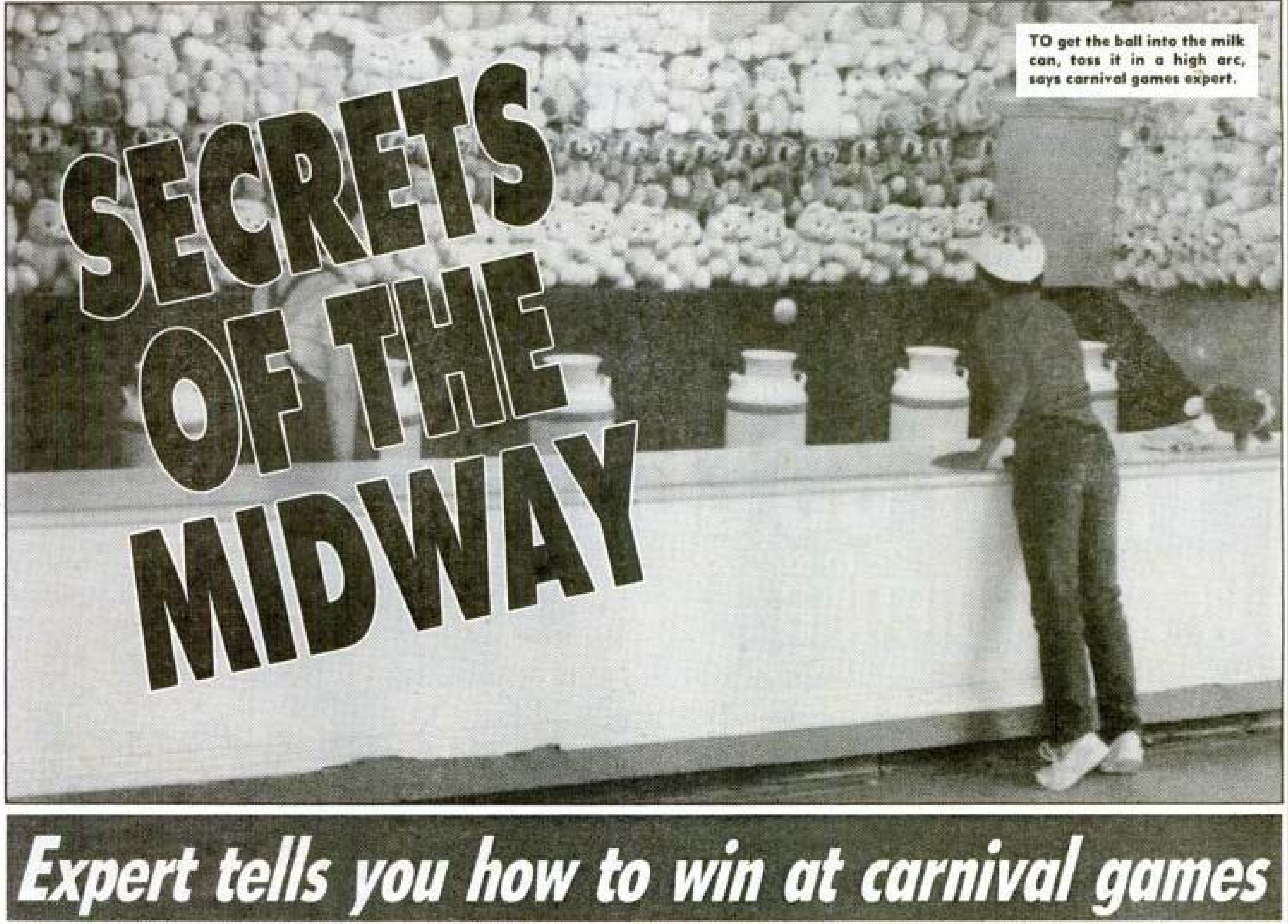
SECRETS OF THE MIDWAY
TO get the ball into the milk can, toss it in a high arc, says carnival games expert.
Expert tells you how to win at carnival games

Conflicting measures

	P = police present		P = police absent	
	G = fair	G = rigged	G = fair	G = rigged
O = lose	1/8	1/8	1/8	1/8
O = win	1/8	1/4	1/8	0

LP:

$$\frac{P(\text{lose} \mid \text{fair})}{P(\text{lose} \mid \text{rigged})} = \frac{\frac{1}{2}}{\frac{1}{2}} = 1$$

LP*:

$$\frac{P(\text{lose} \mid \text{fair}, \text{present})}{P(\text{lose} \mid \text{rigged}, \text{present})} = \frac{\frac{1}{2}}{\frac{1}{3}} = \frac{3}{2}$$

LP:**

$$\frac{P(\text{lose}, \text{present} \mid \text{fair})}{P(\text{lose}, \text{present} \mid \text{rigged})} = \frac{\frac{1}{4}}{\frac{1}{4}} = 1$$

Epistemic interventions

Learning that a policeman was present:

(i) supports 'rigged' hypothesis:

$$\frac{P(\text{present} \mid \text{rigged})}{P(\text{present} \mid \text{fair})} = \frac{\frac{3}{4}}{\frac{1}{2}} = \frac{3}{2}$$

(ii) amounts to an *intervention*:

P(present) = 1

Epistemic interventions

Subsequently learning that I lost:

P(lose|rigged) = P(lose|rigged, present) P(present|rigged) +
P(lose|rigged, absent) P(absent|rigged)
= P(lose|rigged, present) (1) + P(lose|rigged, absent) (0)
= P(lose|rigged, present) = 1/3

P(lose|fair) = P(lose|fair, present) = 1/2

Total support for 'rigged' hypothesis:

$$\frac{P(\text{lose} \mid \text{rigged}, \text{present})}{P(\text{lose} \mid \text{fair}, \text{present})} \frac{P(\text{present} \mid \text{rigged})}{P(\text{present} \mid \text{fair})} = \frac{\frac{1}{3}}{\frac{1}{2}} \frac{\frac{3}{4}}{\frac{1}{2}} = 1$$

Epistemic interventions

Epistemic support for H_1 over H_2 provided by learning E after learning the values of V_1 through V_n:

$$\frac{P(E|H_1)}{P(E|H_2)} = \frac{P(E|V_1, V_2, V_3, \ldots, V_n, H_1)}{P(E|V_1, V_2, V_3, \ldots, V_n, H_2)}$$

LP*

Overall epistemic support for H_1 over H_2:

$$\frac{P(V_1|H_1)P(V_2|H_1)\cdots P(V_n|H_1)P(E|H_1)}{P(V_1|H_2)P(V_2|H_2)\cdots P(V_n|H_2)P(E|H_2)} =$$

$$\frac{P(V_1|H_1)P(V_2|H_1, V_1)\cdots P(V_n|H_1, V_1, \ldots, V_{n-1})P(E|H_1, V_1, \ldots, V_n)}{P(V_1|H_2)P(V_2|H_2, V_1)\cdots P(V_n|H_2, V_1, \ldots, V_{n-1})P(E|H_2, V_1, \ldots, V_n)} =$$

$$\frac{P(E, V_1, \ldots, V_n|H_1)}{P(E, V_1, \ldots, V_n|H_2)}$$

LP**

Upshot for the FTA

- Given I = ‘carbon-based life observes the universe’, then E = ‘the constants are fine-tuned’ provides no support for C over D

- The *total* support granted by learning I and E is in favor of D assuming $P(I|D) > P(I|C)$